

### **REMARKS**

Claims 1-24 are currently pending in the subject application, and are presently under consideration. Claims 1-24 are rejected. Claims 1, 5, 7, 12, 13, and 16 have been amended. Claim 6 has been cancelled. New claim 25 has been added. Favorable reconsideration of the application is requested in view of the amendments and comments herein.

#### **I. Objections to Claims 12 and 13**

Claims 12 and 13 stand rejected because of informalities. Specifically, the Examiner states that there is a duplication of "the separating means" in claim 12, and a duplication of the "means for separating" in claim 13. Representative for Applicant respectfully submits that the duplication of the elements in claims 12 and 13, when claims 12 and 13 are read as a whole, do not provide objectionable language. Specifically, Representative for Applicant respectfully disagrees with the Examiner in that the language of claims 12 and 13 should not be objectionable. However, claims 12 and 13 have been amended to reword the language provided in the claims to overcome the Examiner's objection. Withdrawal of the objection of claims 12 and 13 are respectfully requested.

#### **II. Rejection of Claims 7-11 Under 35 U.S.C. §112, First Paragraph**

Claim 7-11 stand rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement. Specifically, the Examiner asserts that claim 7, as well as claims 8-11 based on their dependence on claim 7, "contain subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention," (Office Action, page 2). The Examiner further states that "[t]he disclosure does not teach details on the tuning algorithm," and that therefore, "one skilled in the art will not be able to make and/or use the invention without undue experimentation," (Office Action, page 3). Representative for Applicant respectfully disagrees.

The requirement for enablement, as set forth in the MPEP, states that "[a]ny analysis of whether a particular claim is supported by the disclosure in an application requires a determination of whether that disclosure, when filed, contained sufficient information regarding the subject matter of the claims as to enable one skilled in the pertinent art to make and use the claimed invention," (MPEP §2164.01). Therefore, a determination of whether claim 7 is enabling can be ascertained based on whether the Specification of the Present Application includes sufficient information as to enable one skilled in the art to make and use the tuning algorithm.

Representative for Applicant respectfully submits that the Specification of the Present Application includes more than sufficient information for enablement of claim 7 regarding the tuning algorithm. As one example, the Specification describes the following:

The control 30 implements an algorithm to tune one or more passive circuit components of the tunable hybrid 12 so that the frequency response of the hybrid can substantially match the frequency response of the subscriber loop 16. The control can implement the algorithm to program (or tune) the hybrid 12 at power-up of the system 10, for example. Alternatively, the control 30 can be utilized offline (*e.g.*, by the manufacturer) based on the known or anticipated subscriber loop characteristics. (Present Application, page 4, line 30 through page 5, line 5).

As another example, the Specification describes the following:

The system 50 can also include a decoder 62 connected to receive a control signal from a tuning algorithm 64. The decoder 62 provides a signal (*e.g.*, a control word) to the switch network 60 to set one or more associated switches within the switch network. By setting the switches, the tunable filter network 54 is set accordingly. In cases where there are multiple tunable components in the filter network 54, the decoder 62 can provide a separate word for each respective network. (Present Application, page 7, ll. 4-10).

Based on these passages, it can be ascertained to tune the passive components of the hybrid to set the frequency response of the hybrid to match the frequency response of the subscriber loop, and that the tuning algorithm is implemented to provide a coded control word that is used to set switches in the tunable filter network, respectively. This latter teaching is summarized later in

the Specification: "[t]he tuning algorithm can provide a control signal to decoder 62 that causes the switch network to adjust the capacitor network accordingly," (Present Application, page 7, ll. 24-25).

As another example, the Specification also describes more specific details regarding the function of the tuning algorithm:

The tuning algorithm 64 is programmed and/or configured for selecting the desired values for of the variable capacitance network 58. For example, the tuning algorithm can provide a test input signal to emulate a transmitter output signal that is provided to drive the hybrid 52. The transmitter output signal is also provided to an interface of an associated communications network (*e.g.*, a subscriber loop), indicated schematically at 68. The hybrid provides a corresponding output signal having a frequency response that varies as a function of the capacitance switched in to the filter network 54 by the switch network 60. (Present Application, page 7, ll. 15-23).

This passage clearly states a manner in which the tuning algorithm is implemented to adjust variable passive components to provide a desired frequency response, as recited in claim 7. In the following paragraph, the Specification provides even more detail about the implementation of the tuning algorithm: "[t]he tuning algorithm 64 can monitor the receiver signal and set the capacitor network 58 to a value that causes the output of the cancellation network 66 to equal to or approach zero for a given test signal," (Present Application, page 7, line 29 through page 8, line 1).

Because the Present Application provides sufficient detail as to the function and implementation of the tuning algorithm, one of ordinary skill in the art could develop such a tuning algorithm without *undue* experimentation. Specifically, the development of such a tuning algorithm could involve little more than writing a program that implements the functions that are both claimed and described in the Specification and debugging the program. Such debugging may be an experimental process. However, the Court of Customs and Patent Appeals has decided that "[t]he test of enablement is not whether any experimentation is necessary, but whether, if experimentation is necessary, it is undue." *In re Angstadt*, 537 F.2d 498, 504, 190 USPQ 214, 219 (CCPA 1976). The development of software or firmware that performs a

defined algorithm, including debugging and validation, would clearly not rise to the level of being undue in light of a described and defined functionality. Therefore, because the functionality of the tuning algorithm is well defined in the Specification, Representative for Applicant respectfully submits that one of ordinary skill would be enabled to develop the tuning algorithm, as claimed and described, without undue experimentation.

For all of these reasons, claim 7 satisfies 35 U.S.C. §112, first paragraph. Withdrawal of the rejection of claim 7, as well as claims 8-11 which depend therefrom, is respectfully requested.

In addition, Representative for Applicant notes that claims 7-11 have been rejected solely on the basis of 35 U.S.C. §112, first paragraph. Representative for Applicant presumes that a complete examination under all statutory requirements has been performed pursuant to MPEP §2106, Section II. Accordingly, Representative for Applicant respectfully requests that the Examiner provide a statement of the allowability of claims 7-11 in view of the resolution of the rejection under 35 U.S.C. §112, first paragraph.

### **III. Rejection of Claims 1-6, 12-17, and 19-20 Under 35 U.S.C. §102(b)**

Claims 1-6, 12-17, and 19-20 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Publication No. 2001-0021250 to Vanderbauwhede, et al. ("Vanderbauwhede"). Withdrawal of this rejection is respectfully requested for at least the following reasons.

Claim 1 has been amended to recite, *inter alia*, a control system configured to selectively adjust at least one tunable component to set at least one of at least one pole and at least one zero of a transfer function of the filter so that the transfer function of the tunable filter corresponds to loop characteristics of the associated communications network. Vanderbauwhede teaches a system that is directed toward removing echo from a receive signal based on a tunable hybrid (Vanderbauwhede, Abstract). However, Vanderbauwhede teaches that the hybrid element has a gain that is independent of frequency. Specifically, Vanderbauwhede states that, "[i]n order to have a hybrid gain independent from the setting or frequencies, the feedback impedances  $Z_b$  of the current to voltage converter 14 are also tuned to be equal to  $Z_b$  because in that case the

current to voltage converter 14 acts as a differential amplifier with gain one," (Vanderbauwhede, paragraph 39). Accordingly, unlike a filter that has a defined transfer function based on poles and zeros that provide a varying gain characteristic across a frequency spectrum, the hybrid of Vanderbauwhede is set to provide a gain that is independent of frequency. Vanderbauwhede further demonstrates that the gain of the PGA in the receive path downstream of the hybrid is unaffected by the echo cancellation (Vanderbauwhede, paragraphs 45-47), and thus further demonstrates the unity gain of the hybrid is independent of frequency. Therefore, Vanderbauwhede does not teach a control system configured to selectively adjust at least one tunable component to set at least one of at least one pole and at least one zero of a transfer function of the filter so that the transfer function of the tunable filter corresponds to loop characteristics of the associated communications network, as recited in claim 1. For these reasons, Vanderbauwhede does not anticipate claim 1. Withdrawal of the rejection of claim 1, as well as claims 2-5 which depend therefrom, is respectfully requested.

Claim 12 has been amended to recite means for selectively tuning the separating means to set at least one of at least one pole and at least one zero of the means for separating to configure the means for separating to have a frequency response that substantially matches loop impedance and line coupling characteristics of an associated communications network to mitigate echo effects of the transmit signal. For substantially the reasons described above regarding amended claim 1, Vanderbauwhede does not teach selectively tuning the separating means to set at least one of at least one pole and at least one zero of the means for separating, as recited in claim 12. Furthermore, none of the cited references teach a frequency response that substantially matches loop impedance and line coupling characteristics of an associated communications network to mitigate echo effects of the transmit signal, as recited in claim 12. Withdrawal of the rejection of claim 12, as well as claims 13-15 which depend therefrom, is respectfully requested.

Claim 15 recites that the desired frequency response is adaptable to a plurality of predetermined frequency bands associated with the loop impedance and line coupling characteristics. As described above, Vanderbauwhede teaches providing a gain of the hybrid that is independent of frequency, and thus does not teach adaptation to a plurality of predetermined

frequency bands associated with the loop impedance and line coupling, as recited in claim 15. Therefore, Vanderbauwhede does not teach anticipate claim 15. Withdrawal of the rejection of claim 15 is respectfully requested.

Claim 16 recites selectively adjusting at least one of at least one pole and at least one zero to set the frequency response based on loop impedance characteristics of an associated subscriber loop. For substantially the same reasons described above regarding claim 1, Vanderbauwhede does not anticipate claim 16. Withdrawal of the rejection of claim 16, as well as claims 17-24 which depend therefrom, is respectfully requested.

Claim 17 recites determining the loop impedance characteristics of the associated communications network. In contrast, Vanderbauwhede teaches that the transmit path return loss that is detected is based on measuring the receive path voltage output from the hybrid relative to the transmit path input voltage to the hybrid, and the variable impedance components are adjusted accordingly (Vanderbauwhede, paragraphs 59 and 60). However, detecting a transmit path return loss does not correspond to determining loop impedance characteristics. Therefore, Vanderbauwhede does not teach anticipate claim 17. Withdrawal of the rejection of claim 17, as well as claim 18 which depends therefrom, is respectfully requested.

For the reasons described above, claims 1-6, 12-17, and 19-20 should be patentable over the cited art. Accordingly, withdrawal of this rejection is respectfully requested.

#### **IV. Rejection of Claims 18 and 21-24 Under 35 U.S.C. §103(a)**

Claims 18 and 21-24 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Vanderbauwhede, and further in view of U.S. Patent No. 6,751,202 B1 to Henrie ("Henrie"). Withdrawal of this rejection is respectfully requested for at least the following reasons.

Claim 18 depends from amended claim 16. As described above, Vanderbauwhede does not teach the elements of claim 16, from which claim 18 depends. The addition of Henrie does not cure the deficiencies of Vanderbauwhede to teach or suggest the elements of claim 16. Therefore, neither Vanderbauwhede nor Henrie, individually or in combination, teach or suggest claim 18. Withdrawal of the rejection of claim 18 is respectfully requested.

Claim 21 also depends from claim 16, and should likewise be allowed for the reasons described above. In addition, claim 21 recites re-adjusting the frequency response on the measured response to a test signal. Henrie teaches measuring a voltage of a test signal to set a gain of a gain stage in a transmission signal cancellation path (Henrie, col. 3, ll. 56-62). The gain of the gain stage is variable, but Henrie does not teach or suggest that the gain is applied differently across a range of frequencies. Thus, Henrie does not teach or suggest re-adjusting the frequency response on the measured response to a test signal, as recited in claim 21. Furthermore, as described above, Vanderbauwhede does not teach or suggest adjustment of a frequency response as recited in claim 21. Since neither Vanderbauwhede nor Henrie, individually or in combination, teach or suggest re-adjusting the frequency response on the measured response to a test signal, as recited in claim 21, withdrawal of the rejection of claim 21 is respectfully requested.

Claim 22 also depends from claim 16, and should likewise be allowed for the reasons described above. In addition, claim 22 recites setting a tunable parameter that changes the frequency response of a hybrid circuit driven by the transmitter signal, applying a test signal to an associated communications network, and determining a ratio of a received signal relative to the transmitter signal. The Examiner asserts that Vanderbauwhede teaches setting a tunable parameter that changes the frequency response of a hybrid circuit driven by the transmitter signal (Office Action, page 8; citing Vanderbauwhede, FIG. 2 and 3). Representative for Applicant respectfully disagrees, as Vanderbauwhede teaches that a transmit path return loss gain is changed by setting a tunable parameter. The teaching in Vanderbauwhede, however, does not correspond to setting the filter does not correspond to changing a frequency response because Vanderbauwhede teaches that the unity gain is maintained independent of frequency. Furthermore, as described above regarding claim 21, Henrie likewise does not teach that a frequency response is changed based on setting a tunable parameter. Therefore, neither Vanderbauwhede nor Henrie, individually or in combination, teaches or suggests claim 22. Withdrawal of the rejection of claim 22, as well as claims 23 and 24 which depend therefrom, is respectfully requested.

**V. New Claim 25**

New claim 25 recites that the control system sets the at least one of the at least one pole and the at least one zero are set such that the transfer function of the filter defines a frequency response that substantially matches loop impedance and line coupling characteristics of the associated communications network. Similar to as described above regarding claim 12, none of the cited art teaches or suggests the elements of new claim 25. Consideration and allowance of new claim 25 is respectfully requested.

**CONCLUSION**

In view of the foregoing remarks, Applicant respectfully submits that the present application is in condition for allowance. Applicant respectfully requests reconsideration of this application and that the application be passed to issue.

No additional fees should be due for this response and amendment. However, please charge any deficiency or credit any overpayment in the fees for this amendment to our Deposit Account No. 20-0668 of Texas Instruments Incorporated.

Respectfully submitted,

**/Gary J Pitzer/**

Gary J. Pitzer  
Registration No. 39,334

**CUSTOMER NO.: 23494**

TAROLLI, SUNDHEIM, COVELL, & TUMMINO L.L.P.  
1300 EAST NINTH STREET, SUITE 1700  
CLEVELAND, OHIO 44114  
Phone: (216) 621-2234  
Fax: (216) 621-4072